

REMARKS

Claims 1, 3-23, 27 and 33-35 were pending in the Application prior to the outstanding Office Action. Applicants have amended claim 1 and canceled claims 9-16, 22-23, 27 and 33-35. In the Office Action, claims 1 and 6 were rejected under 35 U.S.C. §102(b). Claims 3-5 and 17-21 were rejected under 35 U.S.C. §103(a).

I. RESPONSE TO REJECTIONS UNDER 35 U.S.C. §102(b)

In paragraph 2 of the Office Action mailed March 1, 2006, the Examiner rejected claims 1 and 6 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,702,228 issued to Tamai et al. ("*Tamai*"). In paragraph 3 of the Office Action mailed March 1, 2006, the Examiner further rejected claim 1 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 4,715,637 issued to Hosoda et al. ("*Hosoda*").

A. Independent Claim 1 Patently Distinguishes over *Tamai*

Claim 1, among other things, recites:

"a real-time force feedback system for dynamically adjusting the force exerted by the first and second gripper arms on the workpiece while said first and second gripper arms are located in said workpiece-engaging position."

The robotic arm disclosed in *Tamai* does not teach a "a real-time force feedback system." *Tamai* discloses an end effector having auxiliary members 152A and 152B that are rotated by a cam mechanism to grip and release the wafer. The extending and retracting motions of the robotic arm (e.g., first and second arms 51A and 51B) directly control the operation of the cam mechanism. The force exerted against the peripheral edge of the wafer by the auxiliary members 152A and 152B cannot be adjusted. The auxiliary members 152A and 152B either grip the wafer or they do not. The cam mechanism does not include a "real-time force feedback system" that would allow the auxiliary members to increase or decrease the force they exert against the wafer while the auxiliary members are gripping the wafer. Therefore, Applicants respectfully suggest that the end effector recited in claim 1 is not anticipated by *Tamai*.

B. Dependent Claim 6 Patently Distinguish over *Tamai*

Dependent claim 6 depend directly or indirectly from independent claim 1. This dependent claim includes all of the limitations of the independent claim from which it depends.

Applicants respectfully assert that dependent claim 6 is allowable for at least the reasons set forth above concerning independent claim 1.

C. Independent Claim 1 Patently Distinguishes over *Hosoda*

Claim 1, among other things, recites:

“a real-time force feedback system for dynamically adjusting the force exerted by the first and second gripper arms on the workpiece while said first and second gripper arms are located in said workpiece-engaging position.”

The gripping device disclosed in *Hosoda* does not teach a “real-time force feedback system.” *Hosoda*, in the Fig. 19 embodiment, teaches heating and cooling a shape alloy member 196 to move the end effector arms 4 and 5 between an open and closed position, and then inflating a fixing member 190 to further hold the wafer W in place. *Hosoda* does not teach a “real-time force feedback system” that measures the force exerted by the arms 4 and 5 on the wafer. *Hosoda* also does not teach a “real-time force feedback system” that measures the force exerted by the fixing member 190 on the wafer. The fixing member is simply inflated to a preset pressure. And the arms simply rotate until they contact the wafer. *Hosoda* does not teach measuring the force exerted by either the arms 4 and 5 or the fixing member 190 against the wafer - and based on that measurement - adjust the force accordingly. Therefore, Applicants respectfully suggest that the end effector recited in claim 1 is not anticipated by *Hosoda*.

II. RESPONSE TO REJECTIONS UNDER 35 U.S.C. §103(a)

In paragraph 5 of the Office Action mailed March 1, 2006, the Examiner rejected claims 3, 17-18 and 20-21 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,715,637 issued to Hosoda et al. (“*Hosoda*”), in view of U.S. Patent No. 5,022,695 issued to Ayers (“*Ayers*”).

A. Dependent Claim 3 Patently Distinguishes over *Hosoda* in view of *Ayers*

Claim 3 depends from claim 1. Claim 1, among other things, recites:

“a real-time force feedback system for dynamically adjusting the force exerted by the first and second gripper arms on the workpiece while said first and second gripper arms are located in said workpiece-engaging position.”

For at least the same reasons discussed above, the gripping device disclosed in *Hosoda* does not teach or suggest a “real-time force feedback system.”

Ayers does not teach or suggest the elements missing in *Hosoda*. In fact, *Ayers* teaches away from a “real-time force feedback system.” *Ayers* teaches using a Hall effect sensor 26 to sense when the slice 69 is gripped with the three locator pins. *Ayers*, col. 6, lines 11-12. A Hall effect sensor measures the position of a device - not the force applied by a device. As disclosed in *Ayers*, “a predetermined amount of force is applied to restrain, but not damage, the slice 69.” [emphasis added] *Ayers*, col. 6, lines 17-18. The Hall effect sensor does not measure the amount of force applied to the slice 69 and adjust the positions of the locator pins accordingly. Instead, the Hall effect sensor indicates when the locator pins are in the correct position, and then the locator pins grip the slice 69 by a predetermined amount of force. Therefore, Applicants respectfully suggest that the end effector recited in claim 1 is not obvious over *Hosoda* in view of *Ayers*. Because claim 3 depends from claim 1, claim 3 is also not obvious over *Hosoda* in view of *Ayers*.

B. Independent Claim 17 Patently Distinguishes over *Hosoda* in view of *Ayers*

Claim 17, among other things, recites:

“a force sensing device for measuring the amount of force each said contact pad exerts against the peripheral edge of the wafer; and

a force feedback system electrically coupled to said force sensing device and said motor assembly, said force feedback system controlling the operation of said motor assembly based at least in part on the amount of force measured by said force sensing device.”

The gripping device disclosed in *Hosoda* does not teach or suggest “means for dynamically adjusting the force exerted by said first and second gripper arms on the workpiece after said first and second gripper arms are located in said workpiece-engaging position.” *Hosoda* teaches gripping the wafer W with the end effector arms 4 and 5. After the arms 4 and 5 initially grip the wafer W, fixing members 190 and 191 inflate to further hold the wafer W in place. *Hosoda* does not teach or suggest adjusting the force exerted by the arms 4 and 5 on the wafer after the arms 4 and 5 initially grip the wafer. Therefore, Applicants respectfully suggest that the end effector recited in claim 1 is not obvious over *Hosoda*.

Ayers does not teach or suggest the elements missing in *Hosoda*. In fact, *Ayers* teaches away from being able to “dynamically adjusting the force exerted” on the workpiece. *Ayers*, in several instances, teaches that “a predetermined force is applied to the edge of the semiconductor slice.” *Ayers*, 2:26-27; 6:18-19. Therefore, Applicants respectfully suggest that the end effector recited in claim 1 is not obvious over *Hosoda* in view of *Ayers*..

C. Dependent Claims 18 and 20-21 Patently Distinguish over *Hosoda* in view of *Ayers*

Dependent claims 18 and 20-21 depend directly or indirectly from independent claim 17. These dependent claims include all of the limitations of the independent claim from which they depend. Applicants respectfully assert that dependent claims 18 and 20-21 are allowable for at least the reasons set forth above concerning independent claim 17.

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Additional Remarks


The references cited by the Examiner but not relied upon have been reviewed, but are not believed to render the claims unpatentable, either singly or in combination.

In light of the above, it is respectfully submitted that all of the claims now pending in the subject patent application are allowable, and a Notice of Allowance is requested. The Examiner is respectfully requested to telephone the undersigned before an advisory action is issued in order to avoid any unnecessary filing of an appeal.

The Commissioner is authorized to charge any underpayment or credit any overpayment to Deposit Account No. 50-0639 for any matter in connection with this response, including any fee for extension of time, which may be required.

Respectfully submitted,

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